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BIOGRAPHY.

ORMOND STONE.

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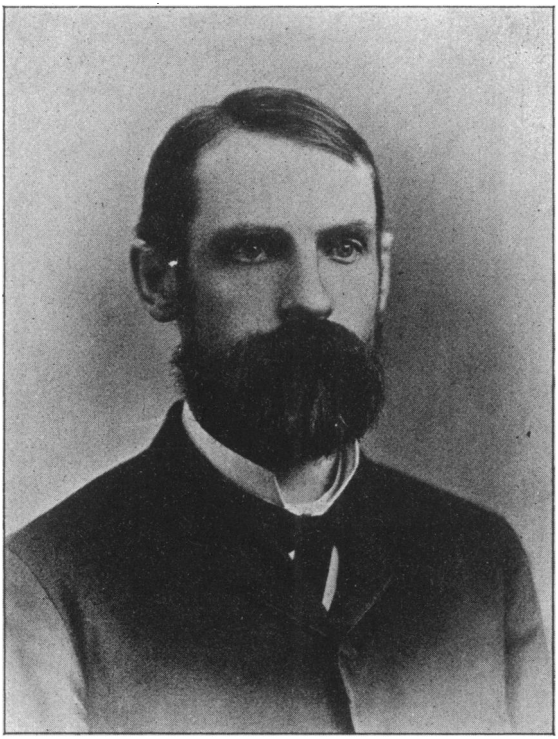
ORMOND STONE was born January 11, 1847, at Pekin, Tazewell County, Illinois, and was the oldest son of Rev. E. Stone, a travelling preacher of the Illinois Conference of the Methodist Episcopal Church. His father was of New England origin; his mother, Scotch-Irish.

In those early days, Illinois was on the frontier; and the Methodist preachers had large circuits which they changed every year or two. Among the places in which he lived were Canton, Nauvoo, and Carthage. From the last of which places the family moved in 1853 to Cook County, and have remained since then in Northern Illinois.

The boy showed a love for mathematics, when a mere child. At the age of seven, while living in the village of Libertyville, he discovered a copy of a new arithmetic, Adams's, which an attempt had been made to conceal from him. This he read twice, working all the problems each time, in a space of less than six weeks.

The next year his father moved to DeKalb Center, where his interest in mathematics was further advanced by an acquaintance with Dr. Matteson, a notice of whom has already appeared in this journal. A few years afterwards his father was stationed in Chicago, where the youth passed through the public schools of the city.

While still in the High School, the Dearborn Observatory was founded in connection with the old University of Chicago, whither Professor Safford



ORMOND STONE.

was called and remained in charge until the great fire in 1872. Young Stone soon made his acquaintance and almost immediately became his pupil, and thus began his career as an astronomer.

After graduating at the High School, he taught one year at Racine College; after which he returned to Chicago to continue his studies at the University. In 1869, in company with Professor Safford, he went to Des Moines, Iowa, to observe the great eclipse of that year. While there, he made the acquaintance of the astronomers sent from the Washington Observatory; and as a result, the next spring, he became an *assistant* in that institution. He was assigned to the Meridian Circle, on which he was employed for the next five years.

In 1875, he was called to the *Directorship* of the Cincinnati Observatory. Here, in connection with his assistants, he employed the 11-inch Equatorial of that institution in an extended and practically complete series of measures of the then known southern double-stars north of 30° south declination. Here, also, he commenced his work as *a trainer of young astronomers*, of whom now probably a larger number occupy important astronomical positions than the pupils of any other teacher in America.

In 1882, he was invited *to take charge of the new Leander McCormick Observatory of the University of Virginia.* This had not then been built. The great 26-inch telescope was finally ready for use in the spring of 1885. This building is memorable as possessing the first large dome made by Warner and Swasey. For the *first* time, also, in this country, electricity was applied to the illumination of the circles and micrometer of the great Refractor.

As the southern *double-stars* had been observed at Cincinnati, it was appropriate that he should devote this larger instrument to observations of southern *nebulæ*. As a result, hundreds of new nebulæ were discovered; and in 1893 there was published a catalogue of the micrometric measurements of the positions of southern nebulæ,—the only extended series of such measurements ever made in this country.

Meanwhile Professor Stone has made a special study of the great nebula of Orion, including a great number of photometric observations of the *condensations* of the Huyghenian region, and of the stars, especially of the *variables*, contained therein.

On the completion of the tenth volume of the *Analyst*, published by the late Dr. Hendricks, of Des Moines, Iowa, when that journal ceased to exist, Professor Stone began the publication of the *Annals of Mathematics*. For a time the editorship was shared with him by his colleague, Professor William M. Thornton; but at the close of the second volume, Professor Stone took entire charge, and the journal has been in his hands ever since.

In this elegantly printed bi-monthly journal, some very select problems are proposed for solution; and the solutions of the problems proposed are published as soon as possible. The *main object* of the publication of the *Annals of Mathematics*, by Professor Stone, is *to encourage mathematical research.*

Professor Stone is a brother of Mr. Melville E. Stone, of Chicago, the well-

known journalist, the founder of the Chicago *Daily News*, and the general manager of the Associated Press.

Professor Stone has written various papers on mathematical and astronomical subjects, which have appeared from time to time in the *Astronomische Nachrichten*, in *Gould's Astronomical Journal*, and in the *Annals of Mathematics*.

Professor Stone is also a member of a number of learned societies. In 1888 he was Chairman of the section of Mathematics and Astronomy of the American Association for the Advancement of Science; and he is at present a member of the Council of the American Mathematical Society.

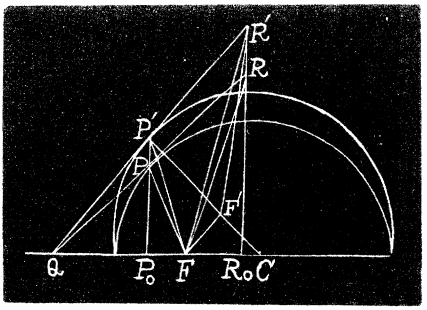
AN ELEMENTARY DERIVATION OF THE LAW OF GRAVITATION AS APPLIED TO PLANETARY MOTIONS.

By ORMOND STONE, University of Virginia.

The following derivation of the law of gravitation from Kepler's first two laws of planetary motion without the use of the machinery of the infinitesimal calculus is a modification of that given by Moebius. The loss by fire of a large portion of the library of the University of Virginia prevents my giving the place in his works where it may be found. As given by Moebius a slight knowledge of solid geometry is required; as here given all the operations are performed in the plane of the orbit. The mass of the planet has been neglected.

Draw a circle having the major axis of the orbit as a diameter. Assume a point P' having such a motion that it is always at the intersection of the circumference of this circle and a straight line drawn through the planet P perpendicular to the major axis of the planet's orbit. The components of the velocities of P and P' in the direction parallel to the major axis are thus equal.

Draw QR tangent to the ellipse at P, and QR' tangent to the circle at P'. Q is situated on the major axis extended. If $PR = V$ represent the velocity of P and $P'R' = V'$ represent the velocity of P', RR' will be parallel to PP'. Let P_0 and R_0 be the intersections of PP' and RR' with the major axis of the orbit. Then by a property of the ellipse



$$P_0P = P_0P' \cos \varphi, \quad R_0R = R_0R' \cos \varphi,$$

in which φ is the angle whose sine is e, the eccentricity of the orbit.